



Chemistry
Stage 6

Draft Syllabus

Consultation Report
February 2017

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1 Background information

The NSW Education Standards Authority (NESA) replaced the Board of Studies, Teaching and Educational Standards NSW (BOSTES) on 1 January 2017.

The preparation of the *Chemistry Stage 6 Draft Syllabus* took into account the broad directions for the learning area, which were developed following public consultation and endorsed by the NESA in December 2014. In 2015, NESA conducted consultation on the draft writing briefs. The draft writing briefs were endorsed by the Board in 2016.

NESA conducted consultation on the draft syllabus in Term 3, 2016.

The consultation program from 20 July 2016 to 31 August 2016 included:

- a meeting of the Years 11–12 Science Board Curriculum Committee on 24 August 2016
- face-to-face consultation meetings
- targeted consultation meetings for:
 - Aboriginal education
 - Special education
 - Industry.
- student voice meetings
- an online survey on the NESA website
- written submissions.

Professional associations and schooling sectors conducted a range of activities during the consultation period to provide feedback to NESA.

Feedback from consultation was analysed and informed revisions to the draft syllabus. The final syllabus is available in an online interactive format on the NESA website.

2 Executive summary

The *Chemistry Stage 6 Draft Syllabus Consultation Report* provides a description of the consultation process and a summary and analysis of feedback received. It details the data and findings gathered from a meeting of the Years 11–12 Science Board Curriculum Committee, 4 metropolitan and 3 regional face-to-face consultation meetings, 6 targeted consultation meetings, 2 student voice meetings, 142 responses to an online survey and 20 written submissions.

The Chemistry draft syllabus has been generally well received and the scope of the course supported. Some respondents raised matters about the continuum of learning and the perceived difficulty of the course. However, this was not raised by the majority of respondents.

A number of responses indicated that the course contained too much content for the time allocated, and was ambitious. This was particularly evident in feedback about the Year 11 course.

Responses indicated support for the concept of the depth study. However, responses also indicated that further clarification was required with regard to the assessment, timing and required depth of the depth studies.

Some responses indicated that the depth of learning required by the content was unclear.

A small number of respondents indicated that the skills of Working Scientifically did not show a continuum of learning from Stage 5 and that Science as a Human Endeavour (SHE) had not been integrated. These matters were not identified by the majority of respondents.

Feedback on assessment was varied, but the general indication was that assessment and HSC examination requirements required clarification.

3 Key matters

Key matters	Actions
There is too much content in the course, especially in Year 11.	The content in Year 11 has been reviewed and applications of Redox have been removed from the Year 11 Module 3 content.
Clarification is required about the depth study and how it is to be implemented, monitored and assessed.	Additional advice has been included in the amended syllabus.
Further information on assessment and examination requirements is required.	Assessment requirements have been reviewed and adjusted. Support materials will include assessment and reporting advice to support syllabus implementation.

4 Analysis

4.1 Rationale

Summary

The majority of survey respondents supported the proposed rationale.

Feedback affirming the rationale

Feedback	Sources
The rationale is clear and concise and presents the distinctive nature of the subject in the curriculum, and is supported.	DoE SCS Survey (x116)

Key matters and actions

Key matters	Sources	Actions
The rationale should be amended to include reference to STEM applications.	DoE STANSW	The rationale was reviewed to include references to STEM.

4.2 Aim

Summary

The majority of respondents supported the proposed aim.

Feedback affirming the aim

Feedback	Sources
The proposed aim provides an appropriate statement of the overall purpose of the syllabus.	DoE SCS Survey (x113)

Key matters and actions

No key matters were raised in relation to the aim.

4.3 Objectives

Summary

The majority of respondents supported the proposed objectives.

Feedback affirming the objectives

Feedback	Sources
The objectives are clear.	DoE Survey (x106)

Key matters and actions

No key matters were raised in relation to the objectives.

4.4 Outcomes

Summary

The majority of survey respondents agreed that the outcomes are appropriate for the Chemistry course. A number of respondents provided feedback that the outcomes need to be more detailed and specific, and that the progression from Stage 5 Science to Stage 6 Chemistry is significant and may pose difficulties.

Feedback affirming the outcomes

Feedback	Sources
The outcomes are relevant and appropriate.	Survey (x87)
The outcomes provide an appropriate continuum of learning from Stage 5 to Stage 6.	Survey (x80)

Key matters and actions

Key matters	Sources	Actions
Progression from Stage 5 Science to Stage 6 Chemistry may be difficult for some students.	CSOArm CSOLism SCS STANSW Submissions 1, 2 Survey (x5)	The content has been reviewed and amended to ensure appropriate development of skills and knowledge.
The purpose of inquiry questions is not clear.	AIS CCSOBB SCS STANSW Submissions 1, 2	A statement relating to the nature and purpose of inquiry questions has been included in the syllabus.

4.5 Course structure and requirements

Summary

Respondents were mixed in their support of the course structure, with approximately half of the respondents agreeing that the structure was clear, manageable and appropriate. Other respondents noted the amount of content to be covered in the allocated time was ambitious.

The inclusion of the depth studies was supported by the majority of respondents. However, further detail about the implementation and assessment of the depth studies is required.

Feedback affirming the course structure and requirements

Feedback	Sources
The inclusion of the depth studies is supported.	AIS DoE Gosford (CM) SCS STANSW Submissions 2, 3 Survey (x9)
The course structure and requirements are clear, manageable and appropriate.	Survey (x58)
The inquiry questions are useful.	Campbelltown (CM) Canterbury (CM) Epping (CM)

Key matters and actions

Key matters	Sources	Actions
Insufficient detail relating to the depth studies and their implementation, monitoring and assessment has been provided.	AIS Canterbury (CM) CCSOBB CSOArm CSOLism Epping (CM) Gosford (CM) Manly (CM) SCS STANSW Submissions 1, 3, 7, 9 Survey (x3) USYD	Support materials providing clarification on the required depth of and approaches to the depth studies will be released in 2017.

Key matters	Sources	Actions
There is too much content in both Year 11 and Year 12.	AINSE AIS Campbelltown (CM) CCSOBB DoE Gosford (CM) Epping (CM) Manly (CM) SCS STANSW Submissions 1, 2, 4 Survey (x6) USYD	Course content has been reviewed and reduced in Modules 3 and 8.
Some of the content is difficult to understand and may require further detail.	AIS Campbelltown (CM) Epping (CM) Gosford (CM) Manly (CM) STANSW SCS USYD	Content has been reviewed and revised for clarity and to describe the intended learning.
The references to Aboriginal and Torres Strait Islander histories and cultures are not meaningful.	AIS Gosford (CM) Manly (CM) SCS Survey (x1)	Aboriginal and Torres Strait Islander histories and cultures content has been reviewed to ensure appropriateness and authenticity.
Greater specificity is required, including the use of verbs, to assist in the interpretation of the content, and to clarify the scope of and depth of learning.	AIS Campbelltown (CM) DoE Epping (CM) Gosford (CM) Manly (CM) SCS STANSW Submission 6	The content has been revised to include verbs, where appropriate, to clarify the scope and depth of learning.

4.6 Assessment

Summary

The majority of the respondents agreed that the requirements for school-based assessment are manageable and provide students with opportunities to develop and demonstrate their learning.

Several respondents commented on suggested changes to the HSC examination and requested that further guidance to examination specifications be provided.

There were a range of views regarding the weighting of assessment components. Some respondents questioned the heavy weighting of practical and skills assessment, and suggested a greater percentage of marks needed to be allocated to examinations. Other respondents supported an emphasis on skills assessment.

Respondents supported a maximum of three assessment tasks in Year 11 and four assessment tasks in Year 12.

Many respondents requested specific assessment guidance on the assessment of the depth studies.

Feedback affirming the information on assessment

Feedback	Sources
The proposed assessment structure is strongly supported.	DoE Manly (CM) Survey (x79)
The school-based assessment requirements provide opportunities for students to develop and demonstrate their learning.	Survey (x79)
The depth study is supported.	DoE Submissions 2, 4 Survey (x53)

Key matters and actions

Key matters	Sources	Actions
The allocation of percentage weighting to assessment components requires review. A maximum of 25% for examinations is too low. Further clarification is needed for assessment structures.	AIS Epping (CM) Manly (CM) Submissions 1, 8 Survey (x2)	The percentage weighting for examinations has been increased. Further advice about assessment will be developed in the support materials.
Further guidelines and instructions are required to prepare students for the HSC examination, including sample examination questions.	AIS Canterbury (CM) CCSOBB DoE Gosford (CM) STANSW Survey (x8)	Support materials will provide assessment advice and sample examination questions.
The weighting of depth studies is too high.	AIS Submission 10	The weighting of the depth studies has been reduced.

4.7 Content

Summary

Mixed responses were received regarding the scope and depth of learning in the syllabus. Over half the respondents agreed that the content is sufficient and appropriate to allow for differentiation and to meet the needs of the diversity of learners.

The need for further information about the depth of study was raised. Some respondents noted the absence of verbs in the content to provide specificity, and the amount of content for the indicative hours.

The main issue in relation to content was the amount of course content.

Respondents supported the content and scope of the draft syllabus and indicated that it appropriately prepares students for future tertiary studies.

Responses requested support for implementing the syllabus, including professional development, sample programs and support materials.

Feedback affirming content

Feedback	Sources
The course content is supported.	Survey (x65)
The course scope and depth is in line with tertiary courses, enabling students to be better prepared for future studies.	Campbelltown (CM) DoE Survey (x3)
The course is appropriately rigorous.	Survey (x11)
The course content flows coherently from Year 11 to Year 12.	Canterbury (CM) Epping (CM) Manly (CM)

Key matters and actions

Key matters	Sources	Actions
The course contains too much content, which is too broad in parts. It will be difficult to cover the content in sufficient depth within the time allocated.	AIS Canterbury (CM) CCSOBB SCS STANSW Gosford (CM) Submissions 1, 2 Survey (x4)	The content has been reviewed and reduced in Modules 3 and 8 to ensure opportunities for depth of learning.
The broad nature of the course makes the content difficult to interpret and the depth to which it must be covered is unclear. The term 'investigate' requires further clarification.	AIS Campbelltown (CM) CCSOBB CSOArm CSOLism Gosford (CM) Manly (CM) SCS STANSW Submissions 1, 6 Survey (x11)	The term 'investigate' has been defined in the syllabus to clarify the depth of learning required and explain practical work.
Support materials are required to implement this syllabus.	AIS Campbelltown (CM) Canterbury (CM) Epping (CM) Gosford (CM) Manly (CM) SCS Wagga Wagga (CM)	Materials will be developed in 2017 to support implementation.
Nuclear Chemistry should be included in the content.	STANSW Submission 9 Survey (x5)	Nuclear Chemistry has been included in Module 1.

4.8 Learning across the curriculum

Summary

The majority of respondents agreed that the Learning across the curriculum content, including opportunities for students to develop their understanding and appreciation of Aboriginal and Torres Strait Islander histories and cultures, is authentic and appropriate.

Some respondents indicated that the opportunities to investigate Aboriginal and Torres Strait Islander histories and culture were not authentic.

Feedback affirming Learning across the curriculum

Feedback	Sources
Most survey respondents agreed that the Learning across the curriculum content was appropriate.	Survey (x61)
Stakeholders representing Aboriginal education strongly supported the inclusion of Aboriginal and Torres Strait Islander histories and cultures content.	Aboriginal Ed

Key matters and actions

Key matters	Sources	Actions
The referencing Aboriginal and Torres Strait Islander histories and cultures is questioned for its relevance.	Gosford (CM) Manly (CM) SCS Submission 1 Survey (x5)	All content that includes references to Aboriginal and Torres Strait Islanders histories and cultures has been reviewed for relevance and authenticity.
Support materials related to Aboriginal and Torres Strait Islander histories and cultures are required to support teaching the Learning across the curriculum content.	AIS DoE Submission 4	Support materials related to Aboriginal and Torres Strait Islander histories and cultures will be developed and made available in 2017.

4.9 Diversity of learners, including Life Skills

Summary

There were a range of views as to whether the syllabus meets the diversity of learners.

Feedback affirming the diversity of learners, including Life Skills

Feedback	Sources
The draft syllabus is more conceptual than the current one and is suitable for students with an interest in Science. It provides better preparation for tertiary studies.	Manly (CM) Survey (x3)

Key matters and actions

Key matters	Sources	Actions
The syllabus is written for students who are preparing for tertiary study.	AIS CCSOBB SCS STANSW Survey (x4)	The syllabus content has been reviewed for access to the diversity of learners.

4.10 Other comments

Summary

Most respondents found the syllabus to be clear, meaningful, relevant and well developed with interesting topics. There was significant enthusiasm and support for the implementation of the syllabus.

A small number of respondents commented that the level of mathematics required was too high. However, there was strong support for the increased rigour of the course.

Feedback affirming the draft syllabus

Feedback	Sources
The glossary is useful and clear.	Survey (x19)
Overall, the syllabus is regarded as one that is suitable to prepare students for further study in Science and is well supported.	CSOArm CSOLism Campbelltown (CM) Survey (x1)

Key matters raised and actions

Key matters raised	Sources	Actions
The format of the syllabus is not easy to navigate. A numbering system is suggested.	AIS Canterbury (CM) DoE Survey (x1)	The syllabus format has been reviewed to ensure a logical progression and flexibility for the delivery of concepts.
Support materials, including sample programs, are required with the release of the syllabus.	AIS Campbelltown (CM) Canterbury (CM) CSOArm CSOLism Gosford (CM) Manly (CM) SCS STANSW Wagga Wagga (CM)	Materials will be developed in 2017 to support initial implementation of the syllabus.

4.11 Student voice

Targeted consultation meetings with students were held to gather feedback about Science. These meetings focused on a discussion of courses within the Years 11 and 12 Science learning areas, including: aspects of Science that students liked most and least; how the course could be improved; and the value of and interest in a Science extension course.

Summary

Student comments focused on the study of Stages 5 and 6 Science. The majority of students supported a more flexible approach to studying Science, including opportunities to research and move away from learning a large amount of prescribed content.

Feedback from student voice on Science

Feedback	Sources
Students enjoy the open-ended nature of tasks.	Armidale (SV) Wagga Wagga (SV)
Students dislike learning extensive content for an examination and preferred the application of knowledge.	Armidale (SV) Wagga Wagga (SV)
Students indicate that there was much more content in the Stage 6 course compared to Stage 5.	Armidale (SV) Wagga Wagga (SV)
Students support the inclusion of more independent research tasks and having time dedicated to exploring Science in depth.	Armidale (SV) Wagga Wagga (SV)
Students strongly endorsed the development of a Science Extension course.	Armidale (SV) Wagga Wagga (SV)

5 Quantitative analysis of survey responses

Note: Due to rounding, some percentages may not total 100 per cent.

Survey item	Number of responses	Strongly agree	Agree	Disagree	Strongly disagree
Rationale 1. The rationale describes the nature and purpose of the course in the curriculum.	121	19%	77%	3%	1%
Aim 2. The aim provides a succinct statement of the overall purpose of the course.	121	19%	73%	6%	2%
Objectives 3. The objectives define the intended learning and the knowledge, understanding, skills, values and attitudes to be developed through study of the course.	116	20%	72%	8%	1%
Outcomes 4. The outcomes and content describe what students are expected to achieve in relation to what they know, understand and can do from studying the course.	108	17%	64%	18%	2%
5. The outcomes provide an appropriate continuum of learning from Stage 5 to Stage 6.	110	16%	56%	21%	6%
Course structure 6. The course structure and requirements are clear, manageable and appropriate.	108	10%	44%	34%	12%
7. The requirements for the programming of a depth study are clear.	107	9%	40%	34%	17%

Survey item	Number of responses	Strongly agree	Agree	Disagree	Strongly disagree
School-based assessment					
8. The school-based assessment requirements are manageable.	108	12%	61%	20%	6%
9. The school-based assessment requirements provide opportunities for students to develop and demonstrate their learning.	107	14%	55%	25%	6%
10. The requirements for the assessment of a depth study are clear.	107	7%	44%	36%	14%
HSC assessment					
11. Please comment on the HSC examination specifications.	70	3%	51%	31%	14%
Content					
12. The content describes the scope and depth of learning.	102	12%	52%	29%	7%
13. The course content is appropriate.	99	12%	55%	24%	9%
Learning across the curriculum					
14. The Learning across the curriculum content, including opportunities for students to develop their understanding and appreciation of Aboriginal and Torres Strait Islander histories and cultures, is authentic and appropriate.	98	4%	58%	27%	11%
Modules					
15. The modules provide a clear progression and development of concepts.	101	15%	72%	11%	2%
16. Sufficient time has been allocated to cover the course outcomes and content for each module.	99	2%	37%	38%	22%

Survey item	Number of responses	Strongly agree	Agree	Disagree	Strongly disagree
17. Working Scientifically is appropriately incorporated in the content.	101	12%	78%	8%	2%
18. There is sufficient scope for a variety of practical experiences.	101	21%	71%	6%	2%
19. There are sufficient opportunities to apply quantitative and analytical skills in the course.	101	25%	69%	4%	2%
Diversity of learners					
20. The syllabus meets the needs of the diversity of learners.	99	5%	46%	35%	13%

6 Respondents

6.1 Consultation meetings

Board Curriculum Committee consultation meeting at NESA on 25 August 2016 (code: BCC)

16 members

Name	Organisation
Dr Timothy Wright	Chair
Mr Vatche Ansourian	NSW Department of Education
Dr Alison Beavis	NSW/Territories Committee of Chairs of Academic Boards/Senates
Ms Olivia Belshaw	Professional Teachers' Council NSW
Mr John Cairns	Australian Association of Special Education NSW Chapter
Ms Karen Daffy	NSW Teachers Federation
Ms Fiona Davies	NSW Parents' Council
Mr Robert Farr	Association of Independent Schools of NSW
Ms Catherine Garrett-Jones	Council of Catholic School Parents NSW
Mr Peter Harold	Independent Education Union NSW/ACT
Ms Alice Leung	NSW Department of Education
Mr Mike Morgan	NSW Teachers Federation
Mr Paul Reilly	TAFE NSW
Mr Timothy Spencer	Federation of Parents and Citizens Associations of NSW
Mr Paul Stenning	Catholic Education Commission NSW
Dr Louise Sutherland	NSW/Territories Committee of Chairs of Academic Boards and Senates

Face-to-face consultation meetings (code: CM)

480 attendees

Location	Date (2016)	Number of attendees
Campbelltown	28 July	65
Canterbury	2 August	82
Gosford	4 August	44
Manly	9 August	59
Epping	11 August	174
Armidale	18 August	35
Wagga Wagga	23 August	21

Targeted consultation meetings**Aboriginal education (code: Aboriginal Ed)**

15 attendees

Location	Date (2016)	Number of attendees
Sydney (am)	28 July	7
Sydney (pm)	28 July	8

Special education (code: Special Ed)

57 attendees

Location	Date (2016)	Number of attendees
Sydney	11 August	19
Sydney	16 August	21
Newcastle	22 August	17

Industry (code: Industry)

28 attendees

Location	Date (2016)	Number of attendees
Sydney	11 August	28

Student voice meetings (code: SV)

30 attendees

Location	Date (2016)	Number of attendees
Armidale	18 August	19
Wagga Wagga	23 August	11

Consultation meeting attendees

Attendees	Number of attendees
Academic	11
Parent	0
Pre-service teacher	5
School executive	62
Teacher	326
Student	1
Other	14

Attendees identified as	Number of attendees
An Aboriginal person	2
A Torres Strait Islander person	0
An Aboriginal and Torres Strait Islander person	0
Not an Aboriginal and/or Torres Strait Islander person	417

Sector	Number of attendees
Government	218
Catholic	62
Independent	173
Non-school based	27

Area of NSW	Number of attendees
Metropolitan	380
Regional	100

Note: The data listed above was gathered from meeting attendance registrations. It may not include all data for those who attended without first registering. Some data may not reflect the total number of attendees.

6.2 Online survey respondents

142 responses

Respondents	Number of respondents
Academic	7
Parent	2
Pre-service teacher	4
Principal	1
School executive	15
School faculty/department	6
Teacher	108
Student	5
Other	9

Respondents identified as	Number of respondents
An Aboriginal person	1
A Torres Strait Islander person	0
An Aboriginal and Torres Strait Islander person	1
Not an Aboriginal and/or Torres Strait Islander person	140

Sector	Number of respondents
Government	72
Catholic	13
Independent	43
Non-school based	14

Area of NSW	Number of respondents
Metropolitan	100
Regional	42

Number of people contributing to the survey	Number of respondents
1	122
2–5	17
6 or more	3

6.3 Written submissions

Organisations, groups and individuals	Code
Association of Heads of Independent Schools of Australia	AHISA
Association of Independent Schools of NSW	AIS
Australian Association of Special Education NSW Chapter	AASE
Catholic Schools Office Armidale	CSOArm
Catholic Schools Office Diocese of Lismore	CSOLism
Community of Catholic Schools Diocese of Broken Bay	CCSOBB
NSW Department of Education	DoE
NSW Teachers Federation	NSWTF
Science Teachers' Association of NSW Inc	STANSW
Sydney Catholic Schools, Archdiocese of Sydney	SCS
Individual respondent	Submission 1
Individual respondent	Submission 2
The Kings School	Submission 3
Sarah Redfern HS	Submission 4
The University of Sydney (USYD)	Submission 5
Individual respondent	Submission 6
Individual respondent	Submission 7
Sydney Grammar School	Submission 8
Australian and International Nuclear Science Education (AINSE)	Submission 9
Individual respondent	Submission 10